YERMAKOV, V.V., dotsent., SAVCHENKO, M.G.

The present status and the future of regular and advanced training for physicians in public health work. Sov.zdrav. 17 no.10:7-10 O '58 (MIRA 11:11)

1. Iz Upravleniya kadrov i uchebnykh zavedeniy Ministerstva zdravookhraneniya SSSR.
(SANITATION, educ.
in Russia (Rus))

SAVCHENKO, M.G.

YERMAKOV, V.V., dotsent, SAVCHENKO, M.G.

A brief historical sketch on the training of obstetricians and gynecologists in the USSR. Akush. i gin. 34 no.2:96-100 Mr-Ap '58. (MIRA 11:5)

(OBSTETRICS, educ
in Russia (Rus))
(GYNECOLOGY, educ.
same)

SAVCHENKO, M.G. (Moskva)

Problems in raising the qualifications of urologists. Vrach.delo no.6:633-635 Je '59. (MIRA 12:12)

1. Starshiy inspektor Upravleniya kadrov u uchebnykh zavedeniy Ministerstva zdravookhraniniya SSSR.
(UROLOGY--STUDY AND TEACHING)

SAVCHENKO, M.G., starshiy inspektor

Present condition of and problems in the advanced training of stomatologists and dentists. Stomatologiia 38 no.2:66-67 Ap '59
(MIRA 12:7)

1. Upravleniye kadrov i uchebnykh zavedeniy Ministerstva zdravookhraneniya SSSR.
(DENTISTRY--STUDY AND TEACHING)
(STOMATOLOGY--STUDY AND TEACHING)

SAVCHENKO, M.G. (Moskva)

System and forms of training psychiatrists and neuropathologists in the U.S.S.R. Zhur.nevr. i psikh. 59 no.10:1253-1255 '59. (MIRA 13:3)

(PSYCHIATRY educ.)
(NEUROLOGY educ.)

SAVCHENKO, M.G.; FEDOTOVA, Z.G., red.; AGZAMOV, K., tekhn. red.

[Brief outline of the history of the development of clinical laboratory diagnosis] Kratkii ocherk istorii razvitiia laboratornoi klinicheskoi diagnostiki. Tashkent, Medgiz UzSSR, 1960. 59 p. (MIRA 15:7)
(MEDICAL LABORATORIES)

SAVCHENKO, M.G. (Moskva)

Organization of postgraduate medical training in Russia, the U.S.S.R. an in the democratic and capitalistic countries. Klin.med. 39 no.2:148-151 F '61. (MIRA 14:3)
(MEDICINE--STUDY AND TEACHING)

SAVCHENKO, M.G. (Moskva)

Specialization and postgraduate training of physicians in the U.S.S.R.
Sov. zdrav. 21 no.1:7-11 '62. (MIRA 15:2)
(MEDICINE—STUDY AND TEACHING)

SAVCHENKO, M.G.; VRONO, M.S. (Moskva)

Work and problems of the Department of Pediatric Psychiatry of the Central Institute of Postgraduate Medical Training for the preparation of pediatric psychoneurologists. Zhur.nevr.i psikh. 62 no.7: 1113-1114 '62. (MIRA 15:9)

(CHILD PSYCHIATRY) (NEUROLOGY)

SAVCHENKO, M.G.; VRONO, M.S. (Moskva)

Training of pediatric psychoneurologists in the U.S.S.R. Vop. okh.mat.i det. 5 no.4:82-86 Jl-Ag '60. (MIRA 13:7)
(PEDIATRICS--STUDY AND TEACHING)

SAVCHENKO, M. I.

E-7

Category : USSR/Solid State Physics - Morphology of Crystals. Crystallization

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 6725

Author : Savchenko, M.I.

Title : Experience in Growing Rochelle Salt Crystals in the Presence of Heteroauxin.

Orig Pub : Tr. Odessk. un-ta, 1955, 145, 55-58

Abstract : The purpose of this investigation is to clarify the influence of heteroauxin as a co-solvent on the speed of growth and the habitus of Rochelle salt crystals, obtained by crystallization from aqueous solution. Crystallization was carried out under weak supersaturations in crystallizers with a capacitance up to 0.5 meters without a thermostat. For each 100 cc of Rochelle salt solution, additions of 0.5 to 100 mg heteroauxin were made in the various experiments. It was established that the addition of heteroauxin does not influence substantially the speed of growth in the external shape of the Rochelle salt crystals. The growing crystals have the same shape as their primers. The observed

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the external shape cannot be attributed to the influence of heteroauxin.

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D298/D303

Distribution of dispersed ...

water from the above-mentioned chemical elements under the same experimental conditions and also to determine similarities and differences in the distribution of these elements among the main components of the reservoirs. The method consisted in passing solutions of the isotopes through a series of small aquarium tanks containing earth, water plants and appropriate microplankton and periphyton. Experiments with strontium showed that with a daily flow of 6 liters of a solution with a concentration of 10 µc/l, the concentration of strontium at the end of the tank series is 4.5 - 10.8% of the original concentration. By decreasing the daily flow of solution to 3 liters and by increasing the size of the first tank the water is deactivated of strontium. Strontium was found to be distributed evenly among the components of the tanks. With a flow of 6 liters/day the concentration of ruthenium at the end of the tank series is 1.5 - 2.5% of the original concentration. Study of its distribution among the components of the tanks showed that it was absorbed mainly by the biomass. In the experiments with cesium, complete deactivation of the water was achieved. Cesium was mainly

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Distribution of dispersed ... D298/D303

absorbed by the ground material in the tanks. With a flow of 6 liters/day complete deactivation of cerium was also attained. Decrease in the daily flow of solution and an increase in the size of the first tank made no essential difference to the results of the experiments. Cerium, like ruthenium, was mainly absorbed by the biomass. A high degree of deactivation was achieved in experiments with an unseparated solution of uranium fragments. The longer the experiment continued, the less was the deactivation of the water. By reducing the flow of the solution to 3 liters/day and by increasing the volume of the first and last tanks, a high degree of deactivation was achieved, even in protracted experiments (more than 6 months). The coefficient of accumulation was highest in the periphyton and detritus, lower in the higher plants and lowest in the ground material. Of the elements studied the highest coefficient of accumulation in the biomass was given by cerium, and the lowest by strontium. In the ground material the highest coefficient of accumulation was given by cesium and the lowest by ruthenium. On the basis of the results the authors divide the radioactive elements studied into three main groups according to their

X

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AGAFONOV, B.M.; DOLGIKH, T.I.; SAVCHENKO, M.I.; TIMOFEYEV-RESOVSKIY, N.V.

Distribution of scattered elements in different components of water reservoirs. Report No.4: Experiments on the distribution of strontium, ruthenium, cesium, cerium, and the unseparated solution of uranium fission fragments in a series of tanks. Trudy Inst. biol. UFAN SSSR no.12:238-277 '60. (MIRA 14:1)
(Radioactive substances) (Water—Pollution)

SAVCHENKO, M. I.

Mbr., Botanical Inst. im. V. L. Komarov, Dept., Biol. Sci., Acad. Sci., -c1949-c50-. Mbr., Lab. Morphology & Anatomy of Plants, Leningrad, -c1949-. "Morphologic-Anatomical Properties of Achenes of the Thistle Family from the Anthemidean Tribe as an Indicator of the Conditions of Their Genesis and Habitat," Botan. Zhur., 34, No. 2, 1949; "The Biology of Green Plastids in Plants," Dok. AN, 70, No. 6, 1950.

SAVCHENKO, M. I.

Savchenko, M. I.- "The application of anatomical -morphological analysis in clarification of the status of the genus Brachanthemun D C in the Compositea family," Botan. materialy Gerbariya Botan. in-ta im. Komarova, Akad. nauk SSSR. Vol. XI, 1949, p. 201-207

SO: U-4934, 29 Oct 53, (Letopis 'Zhurnal 'nykh Statey, No. 16, 1949).

ALEKSANDROV, V. G.; SAVCHENKO, M. I.

Flowers - Anatomy

Peculiarities of the history of development of fruit and seeds in the compositae family. Trudy Bot. Inst. AN SSSR Ser. 7, No. 2, 1951.

9. Monthly List of Russian Accessions, Library of Congress, June 1952. UNCLASSIFIED.

SAVCHENKO, M.I.

[redacted]

Some morphological peculiarities in the development of the inflorescence of Compositae (exemplified by species of the genus Taraxacum L.). Trudy Bot.inst. Ser.7 no.3:48-86 '52. (MIRA 8:4)

(Inflorescence) (Compositae)

SAVCHENKO, M.I.

Development of the so-called jacket of dandelion roots. Bot.zhur.41 no.3:335-346 Mr '56. (MLRA 9:8)

1. Botanicheskiy institut imeni V.L. Komarova Akademii nauk SSSR, Leningrad.

(Dandelions)

SAVCHENKO, M.I.

Nature of the carpel in angiosperms; history of studying the nature of the carpel. Trudy Bot.inst.Ser.7 no.4:138-171 '57.

(MIRA 10:3)

(Angiosperms) (Carpel)

SAVCHENKO, M.I.

Nature of the ovule in angiosperms studied on the example of double cherry (Cerasus vulgaris Mill. f.flore pleno hort.). Trudy Bot.inst.Ser.7 no.4:172-200 '57. (MLRA 10:3)
(Cherry) (Carpel) (Angiosperms)

SAVCHENKO, M.I.

Morphological nature of the ovule [with summary in English]. Probl. bot. no.3:271-287 '58. (MIRA 11:7)
(Ovaries (Botany))

SAVCHENKO, M.I.

Deviations in ovule development of some angiosperms. Bot.zhur.
44 no.6:786-804 Je '59. (MIRA 12:11)

1. Botanicheskiy institut im. V.L.Komarova AN SSSR, Leningrad.
(Ovaries (Botany))

SAVCHENKO, M.I.

Structural characteristics of chloroplasts in seed plants. Bot. zhur. 45 no.7:951-967 Jl '60. (MIRA 13:7)

1. Botanicheskiy institut im. V.L.Komarova Akademii nauk SSSR, Leningrad.
(Chromatophores) (Plant cells and tissues)

SAVCHENKO, M.I.; DMITRIYEVA, A.A.

Biology of the development of Ruscus hypophyllum L. and some peculiarities of the formation of its flower and fruit. Trudy Bot.inst. Ser. 7 no.5:46-56 '62. (MIRA 15:2)
(Ruscus) (Plants, Flowering of)

SAVCHENKO, M.I.; KOMAR, G.A.

Formation and significance of calcium oxalate crystals in plant
cell. Trudy Bot.inst.Ser. 7 no.5:86-106 '62. (MIRA 15:2)
(Calcium oxalate) (Plant cells and tissues)

SAVCHENKO, M.I.; PETROVA, L.R.

Morphology of the ovule of barley (Hordeum vulgare L.) and some characteristics of its development. Bot. zhur. 48 no.11: 1623-1638 N '63. (MIRA 17:4)

1. Botanicheskiy institut imeni Komarova AN SSSR, Leningrad.

VASIL'YEVSKAYA, V.K.; SAVCHENKO, M.I.; YAKOVLEV, M.S.

Ekaterina Aleksandrovna Mokeeva, 1885- ; on her 80th birthday. Bot. zhur. 50 no.12:1769-1771 D '65. (MIRA 19:2)

1. Leningradskiy gosudarstvennyy universitet imeni Zhdanova i Botanicheskiy institut imeni Komarova AN SSSR, Leningrad.

SAVCHENKO, M. K. DYLGEROV, V. D., and L. V. KYRENSKIY, (Krasnoyorsk)

"The Dynamics of the Domain Structure in the Silicon-Iron Crystals," paper presented at the International Conference on Physics of Magnetic Phenomena, Sverdlovsk, USSR, 23-31 May 1956.

18-8-18/25

weak internal stresses, as well as also by the non-uniformity of the structure of the sample. If the sample is stretched in a longitudinal direction, stretching of the structure of the doma lines takes place in the transverse direction by the parallel shifting of the doma partitions, on which occasion a corresponding equalization of stresses occurs. In this case also wedge-shaped doma partitions may occur, which broaden in the direction of their point as soon as the extending force is applied. When the samples are extended in the transverse direction, the sharp doma partition walls may be dissolved. The structure on this occasion becomes wedge-like and, in the course of further extension, the unevenly distributed line particles are formed. With a further extension of these line parts they form a peculiar sort of ordered mosaic. In the case of extension in a certain direction it was observed that the doma structure was divided, on which occasion new partition walls were formed or partition walls disappeared entirely. The chapter: *The influence of the external magnetic field* describes the process of extending the sample in a direction in which its magnetic structure assumes a uniaxial character. In these uniaxial crystals the processes of rotation are then observe and investigated by means of powder patterns. Rotation of the magnetization vector was determined according to saturation figures, Dynamics of the Doma Structure in Crystals of Silicous Iron. 48-8-18/25

which were always perpendicular to the direction of the magnetization vector. In this paper series of cinematographic films are mentioned which confirm the aforementioned statement. There are 8 figures and 2 non-Slavic references.

ASSOCIATION: **Krasnoyarsk State Pedagogical Institute** (**Krasnoyarskiy gos.** pedagogicheskiy institut)

AVAILABLE: Library of Congress

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SOV/137-58-9-19791 D

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 9, p 239 (USSR)

AUTHOR: Savchenko, M.K.

TITLE: Effect of Elastic Stresses on the Structure of the Domains of Transformer Iron (Vliyaniye uprugikh napryazheniy na strukturu domenov transformatornogo zheleza)

ABSTRACT: Bibliographic entry on the author's dissertation for the degree of Candidate of Physical-Mathematical Sciences, presented to the Krasnoyarskiy gos. ped. in-t (Krasnoyarsk State Pedagogical Institute), Krasnoyarsk, 1958

ASSOCIATION: Krasnoyarskiy gos. ped. in-t (Krasnoyarsk State Pedagogical Institute), Krasnoyarsk

1. Iron--Structural analysis 2. Iron--Stresses

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SOV/137-58-9-19767

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 9, p 236 (USSR)

AUTHORS: Kirenskiy, L.V., Savchenko, M.K.

TITLE: Domain Structure of the Crystals of Ferrosilicon Upon the Application of Elastic Stresses (Domennaya struktura kristallov kremnistogo zheleza pri nalozhenii uprugikh napryazheniy)

PERIODICAL: Izv. vyssh. uchebn. zavedeniy. Fizika, 1958, Nr 1, pp 35-38

ABSTRACT: The results of observations are adduced on the domain structure (with the aid of Bitter's figures) of crystals of ferrosilicon when they are stretched along a [110] direction. The results of a similar earlier work (RZhKhim, 1955, Nr ?, abstract 31155) are confirmed and refined; in particular, besides the two domain types I and II, two more, the so-called "drops" and "chains", were discovered. Observations on both the large single crystals and on the fine-crystalline specimens show the influence of the grain boundaries. It is also shown that upon stretching free dispersion fields are present on the boundaries of the crystals as the result of the reorganization of the domain structure. Microphotos are included. R.O.

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1. Iron-silicon crystals--Structural analysis 2. Iron-silicon crystals --Stresses

SOV/137-58-9-19768

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 9, p 236 (USSR)

AUTHORS: Kirenskiy, L.V., Savchenko, M.K.

TITLE: On Prismatic Interlocking Domains in Ferrosilicon Crystals (O prizmaticheskikh zamykayushchikh domenakh v kristallakh kremnistogo zheleza)

PERIODICAL: Izv. vyssh. uchebn. zavedeniy. Fizika, 1958, Nr 1, pp 39-41

ABSTRACT: The change in the structure of the domains of the interlocking type in ferrosilicon crystals (4% Si) was investigated by the method of the Bitter figures upon the stretching of the specimens. Some new data were obtained, which agree with the theory of regions of spontaneous magnetization. Interlocking ranges were likewise discovered not only on the borders of the crystals but also within them.

R.O.

1. Iron-silicon crystals--Structural analysis 2. Iron-silicon crystals --Theory

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KIRENSKIY, L.V.; SAVCHENKO, M.K.

Effect of pressure on domain structure near inclusions. Izv. vys. ucheb. zav.; fiz. no.3:141-143 '58. (MIRA 11:9)

1. Krasnoyarskiy pedinstitut.
(Metal crystals) (Crystal lattices)

SAVCHENKO, M.K.

AUTHOR: None Given SOV/129-58-9-16/16

TITLE: Dissertations (Dissertatsii)

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, Nr 9, pp 63-64 (USSR)

ABSTRACT: The following dissertations were presented and approved: For the degree of Doctor of Physico-Mathematical Sciences: G. Ye. Zil'berman "On the Theory of Oscillation Effects in Metals in Magnetic Fields", Khar'kov, 1958, Khar'k. Gos. Un-t im. A. M. Gor'kogo (Kharkov State University imeni A. M. Gorkiy). V. S. Shpingel' "Investigations in β- and γ-spectroscopy", Moscow 1958, Mosk. Gos. Un-t im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov).
For the degree of Candidate of Physico-Mathematical Science: O. S. Galkina "Investigation of the Electrical Resistance and its Changes Inside a Magnetic Field for Ferromagnetic Metals and Alloys" Moscow, 1958, Mosk. un-t im. M. V. Lomonosova (Moscow University imeni M.V.Lomosov). Yu. D. Kozmanov "Investigation of the High Temperature Oxidation of Tungsten, Molybdenum and of Some Binary Alloys of Iron with Tungsten and Molybdenum", Sverdlovsk, 1958,

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SOV/129-58-9-16/16

Dissertations

Ural'skiy gos. un-t im. A. M. Gor'kogo (Ural State University imeni A. M. Gor'kiy). M. K. Savchenko "Influence of Elastic Stresses on the Structure of the Domains of Transformer Steel", Krasnoyarsk, 1958, Krasnoyarsk. gos. ped.in-t (Krasnoyarsk State Pedagogic Institute). P. N. Stetsenko "Investigation of the Magnetic Properties and the Structure During Phase Transformations in Iron-Vanadium Alloys", Moscow, 1958, Mosk. gos. un-t im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov).
For the degree of Candidate of Chemical Science:
A. Ya. Groskaufmanis "Basic Chlorides of Aluminium and Their Optical Properties", Riga, 1958, Latv. gos. un-t im. P. Stuchki (Latvia State University imeni P. Stuchka).
Yu. N. Kukushkin "Kinetic Investigation of the Substitution Reactions in Some Compounds of Bivalent Platinum", Leningrad, 1958, Leningr. tekhnol. in-t im. Lensoveta (Leningrad Technological Institute imeni Lensovet).
N. A. Parpiyev "X-ray Structural Investigation of Crystals of Complex Compounds of Ruthenium, Containing Hydroxonitrozo Groups", Moscow, 1958, Mosk. gos. un-t im.M.V.Lomonosova

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Dissertations SOV/129-58-9-16/16

(Moscow State University imeni M. V. Lomonosov). I. S. Sazonova "Oxidation of Carbon Monoxide on Protoxides of Nickel and its Solid Solutions", Moscow, 1958, AN SSSR, In-t fizicheskoy khimii (Institute of Physical Chemistry, Ac.Sc. USSR). E. V. Sobotovich "Certain Problems of the Geochemistry of Lead Isotopes", Leningrad, 1958, Radiyevyy in-t im. V. G. Khlotina (Radium Institute imeni V. G. Khlotin). A. N. Goryaga "Magnetization of Ferromagnetics Near the Curie Point", Moscow, 1958, Mosk. gos. un-t im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov). R. N. Gurzhi "Quantum Theory of Absorption of Electromagnetic Waves of Metals in the Infra-red Range of the Spectrum", Khar'kov, 1958, Khar'k. gos. un-t im. A. M. Gor'kogo (Kharkov State University imeni A. M. Gorkiy). I. M. Dmitrenko "Influence of Pressure from All Sides on the Magnetic Properties of Metals at Low Temperatures", Khar'kov, 1958, Khar'k. gos. un-t im. A. M. Gor'kogo (Kharkov State University imeni A. M. Gorkiy). M. Ya. Zakutner "Investigation of the Texture of Rolling and Recrystallisation in Low Alloy

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Dissertations SOV/129-58-9-16/16

(0.9% Si) Dynamo Steel", Sverdlovsk, 1958, Ural'skiy gos. un-t im. A. M. Gor'kogo (Ural State University imeni A. M. Gor'kiy). A. V. Cheremushkina "Investigation of the Hall Effect in Ferromagnetics", Moscow, 1958, Mosk. gos. un-t im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosova). A. V. Zakrzhevskaya "Over-voltage of Hydrogen and Oxygen on Nickel in Solutions of Caustic Soda Containing Alkali Earth Metals", Tashkent, 1958, In-t khimii AN Uzb.SSR (Institute of Chemistry, Ac.Sc., Uzbek SSR). N. N. Kozachek "Organosols of Alloys", Kiyev, 1958, AN Ukr.SSR, In-t obshchey i neorganicheskoy khimii (Ac. Sc. Ukraine SSR, Institute of General and Inorganic Chemistry). R. Payeda "Investigation of the Methods of Determining Cobalt", Vilno, 1958, Vil'nyusskiy gos.un-t (Vilno State University). Yu. D. Tret'yakov "Investigation of the Structural Transformations of Certain Magnetic Alloys by the Method of the Real Heat Capacity", Moscow, 1958, Mosk. gos. un-t im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov).

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Dissertations SOV/129-58-9-16/16

E. I. Yasinskene "Investigation of the Complex Compounds of Cr (III), Iron (III) and "tipazh" (III) with Urea, Vil'nyus, 1958, Vil'nyusskiy gos. un-t (Vilno State University).

For the degree of Doctor of Technical Science:

V. N. Sokolov "New Methods of Calculation of the Heating of Metal in Industrial Furnaces", Moscow, 1958, TsNIITMASh. I. I. Khoroshev "Theoretical Foundations of Accelerated Annealing of Malleable Iron", Moscow, 1958, In-t metallurgii im. A. A. Baykova (Institute of Metallurgy imeni A. A. Baykov). V. M. Zamoruyev "Tungsten in Steel", Moscow, 1958, AN SSSR, In-t metallurgii im. A. A. Baykova (Ac. Sc. USSR, Institute of Metallurgy imeni A.A.Baykov). A. M. Korol'kov "Dependence of the Properties, As-Cast, of Non-ferrous Alloys on Their Composition and the Type of the Diagram of State", Moscow, 1958, AN SSSR, In-t metallurgii im. A. A. Baykova (Ac. Sc. USSR, Institute of Metallurgy imeni A. A. Baykov). I. N. Fridlyander "Searching for High Strength Aluminium Alloys of the System Aluminium-Zinc-Magnesium-Copper", Moscow, 1958, Mosk.in-t tsvetn.metallov i zolota im. M. I. Kalinina

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Dissertations SOV/129-58-9-16/16

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For the degree of Candidate of Technical Science:

Yu. M. Buravlev "Investigation of the Influence of the Structure of an Alloy on the Results of Spectral Analysis of Complex and Simple Alloyed Steels", Sverdlovsk, 1958, AN SSSR, Ural'skiy filial (Ural Branch of the Ac.Sc. USSR).

S. D. Vangeyngeym "X-ray Investigation of the Inter-Crystallite Internal Adsorption in Silver-base Alloys", Sverdlovsk, 1958, Ural'skiy gos. un-t im. A. M. Gor'kogo (Ural State University imeni A. M. Gor'kiy).

S. I. German "Investigation of the Thermal Stability of the Cast Steel 20 KhM-L as a Material for Welded-Cast Assemblies of Steam Turbines", Khar'kov, 1958, Khar'kovsk. politekhn. in-t im. Lenina (Kharkov Polytechnical Institute imeni Lenin). V. I. Gorbunov "Utilisation of a Betatron in the Defectoscopy of Steel Components", Tomsk, 1958, Tomskiy politekhn. in-t im. S. M. Kirova (Tomsk Polytechnical Institute imeni S. M. Kirov).

A. A. Kasumov "Determination of the Range of Application of Work Hardened Steels in Curved Ferroconcrete Structures", Baku, 1958, Azerbaydzh. politekhn.in-t (Azerbaydzhan Polytechnical Institute).

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N. S. Kuz'mina "Determination of the Plastic Properties of the Alloy MN5 and Establishment of the Technological Process of Manufacture of Tubes from this Alloy", Moscow, 1958, Mosk. in-t tsvet. metallov i zolota im. M. I. Kalinina (Moscow Institute of Non-ferrous Metals and Gold imeni M. I. Kalinin). I. I. Moroz "Investigation of the Influence of Various Factors in Electrolytic Zinc Coating on the Mechanical Properties of Steel", Moscow, 1958, Mosk. khim.-tekhnol. in-t im. D.I.Mendeleyeva (Moscow Chemical-Technological Institute imeni D. I. Mendeleyev). I. G. Rivkin "Investigation of the Strength of Cast and Rolled High Speed Steel", Leningrad, 1958, Leningr. politekhn. in-t im. M. I. Kalinina (Leningrad Polytechnical Institute imeni M.I. Kalinin). V. P. Rudometkin "Automation of the Inspection of Hardened Steel Components by the Method of Magnetic Permeability", L'vov, 1957, L'vovskiy politekhn. in-t (L'vov Polytechnical Institute). M. A. Studnits "Investigation of the Intergranular Fracture of Cast and Overheated Steel by Means of Radioactive Isotopes", Moscow, 1958, TsNIITMASh.

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G. A. Tulyakov "Investigation of the Creep a of Austenitic
High Temperature Steel Under Conditions of/Complex Stress
State", Moscow, 1958, TsNIITMASh.
I. A. Useynov "Properties and Technique of Utilisation of
Compressed Air in the Heat Treatment of Tube Ends",
Baku, 1958, Gruz. politekhn. in-t im. S. M. Kirova
(Georgia Polytechnical Institute imeni S. M. Kirov).
V. G. Chernyy "Study of the Processes of Hardening and
Softening of Certain Nickel-base Alloys", Dnepropetrovsk,
1958, Dnepropetrovsk metallurgichesk. in-t im. I. V.Stalina
(Dnepropetrovsk Metallurgical Institute imeni I.V.Stalin).
Chou Shih-ch'ang "Investigation of the Influence of
Certain Transient Elements on the Structure and Properties
of Copper-Beryllium Alloys", Moscow, 1958, Mosk.in-t
tsvet. metallov i zolota im. Kalinina (Moscow Institute
of Non-ferrous metals and Gold imeni Kalinin).
V. V. Averin "Solubility and Activity of Oxygen in Liquid
Iron, Nickel, Cobalt and its Alloys", Moscow, 1958,
AN SSSR In-t metallurgii im. A. A. Baykova (Institute of
Metallurgy imeni A. A. Baykov, Ac. Sc. USSR).

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SOV/129-58-9-16/16

Dissertations

N. P. Barshteyn "Certain Problems of Ageing of Deformed Magnesium Alloys", Moscow, 1958, Mosk. in-t tsvetn. metallov i zolota (Moscow Institute of Non-ferrous Metals and Gold). B. D. Vasilenko "Study of the Reactions of Chlorinating of Zirconium Dioxide and Zirconium Carbide", Moscow, 1958, Mosk. in-t tsvetn. metallov i zolota im. M. I. Kalinina (Moscow Institute of Non-ferrous Metals and Gold imeni M. I. Kalinin).
A. M. Belikov "X-ray Determination of the Constants of the Quasi-elastic Force of Thermal Oscillations and of the Coefficients of Thermal Expansion of High Melting Point Metallic Phases", Moscow, 1958, Mosk. in-t stali im. I. V. Stalina (Moscow Steel Institute imeni I.V.Stalin).
M. S. Vendrikh "Influence of the Scattering of the Heat Capacity Data on the Equilibrium Constant and Determination of the Heat Capacity of the Borides of Certain Metals", Moscow, 1958, Mosk. in-t tsvetn. metallov i zolota im. M. I. Kalinina (Moscow Institute of Non-ferrous Metals and Gold imeni M. I. Kalinin). A. M. Volkov "Investigation of the Application of the Low Alloy Steel EI603 for Cutting Tools", Moscow, 1957, MVTU.

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SOV/129-58-9-16/16

Dissertations

F. Ya. Iokheles "Investigation of the Type II Stresses Caused by Structural Transformations and Wear in Hardened Steels as Applied to Over-Loaded Toothed Gears", Kiyev, 1958, AN Ukr.SSR, In-t stroit.mekhaniki (Ac.Sc. Ukr. SSR, Institute of Engineering Mechanics). L. I. Kogan "On the Intermediate Transformation of Austenite", Moscow, 1958, Mosk. in-t stali im. I.V.Stalina (Moscow Institute of Steel imeni I.V. Stalin). P. I. Mel'nichuk "Investigation of the Ageing of Alloys by the Method of Determining the Modulus of Elasticity", Kiev, 1958, Kiyevsk. politekhn. in-t (Kiyev Polytechnical Institute). I. A. Mikhaylov "Investigation of the Plastic Properties of the High Temperature Alloy EI617 and Development of a Technological Process of Accurate Stamping of the Blades of Turbo-jet Engines, Moscow,1958, Mosk. aviats-tekhnolog. in-t (Moscow Aviation-Technology Institute). M. A. Tylkin "Influence of the Chemical Composition and of the Conditions of Heat Treatment of Steel on the Changes of the Mechanical Properties and the Coercive Force During Tempering", Dnepropetrovsk, 1958, Dnepropetrovsk. metallurg. zavod im. Dzerzhinskogo (Dnepropetrovk Metallurgical Works imeni Dzerzhinskiy)

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SOV/129-58-9-16/16

Dissertations

K. T. Chernousova "Investigation of the Crack Formation During Crystallisation of Aluminium Alloys", Moscow, 1958, Mosk. in-t tsvetn. metallov i zolota im. M. I. Kalinina (Moscow Institute of Non-ferrous Metals and Gold imeni M. I. Kalinin).

1. Scientific research--USSR

Card 11/11

SAVCHENKO, M.K.

PHASE I BOOK EXPLOITATION SOV/5526

Vsesoyuznoye soveshchaniye po magnitnoy strukture ferromagnetikov, Krasnoyarsk, 1958.

Magnitnaya struktura ferromagnetikov; materialy Vsesoyuznogo soveshchaniya, 10 - 16 iyunya 1958 g., Krasnoyarsk (Magnetic Structure of Ferromagnetic Substances; Materials of the All-Union Conference on the Magnetic Structure of Ferromagnetic Substances, Held in Krasnoyarsk 10 - 16 June, 1958) Novosibirsk, Izd-vo Sibirskogo otd. AN SSSR, 1960. 249 p. Errata slip inserted. 1,500 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut fiziki Sibirskogo otdeleniya. Komissiya po magnetizmu pri Institute fiziki metallov OFMN.

Resp. Ed.: L. V. Kirenskiy, Doctor of Physical and Mathematical Sciences; Ed.: R. L. Dudnik; Tech. Ed.: A. F. Mazurova.

PURPOSE: This collection of articles is intended for researchers in ferromagnetism and for metal scientists.

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SOV/5526

Magnetic Structure (Cont.)

D'yakov, G. P. [Fizicheskiy fakul'tet MGU - Physics Department of the Moscow State University]. Accounting for the Domain Structure in the Calculation of Magnetostriction 21

Kirenskiy, L. V., and M. K. Savchenko [Institut fiziki SO AN SSSR - Institute of Physics, Siberian Branch AS USSR, Krasnoyarsk]. On the Spatial Distribution of the Domain Structure in Ferromagnetic Substances 25

Druzhinin, V. V., and T. I. Prasova [Verkh-Isetskiy metallurgicheskiy zavod - Verkh-Isetskiy Metallurgical Plant]. On the Application of the Powder-Figure Method to the Study of the Magnetic Properties of Transformer Steel 29

Kirenskiy, L. V., and I. F. Degtyarev [Institute of Physics, Siberian Branch AS USSR, Krasnoyarsk]. Temperature Dependence of the Domain Structure in Crystals of Iron Silicide 33

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Evaluation of the Magnitude of the Barkhausen Jump 113

Ignatchenko, V. A., and A. M. Rodichev [Institute of Physics, Siberian Branch AS USSR, Krasnoyarsk]. On the Distribution of Barkhausen Jumps by Magnitude 123

Rodichev, A. M., N. M. Salanskiy, and V. I. Sinegubov [Institute of Physics, Siberian Branch AS USSR, Krasnoyarsk]. Statistical Distribution of Barkhausen Jumps by Duration 129

Rodichev, A. M. [Institute of Physics, Siberian Branch AS USSR, Krasnoyarsk]. Dependence of the Barkhausen Effect on the Rate of Change of the Magnetic Field 135

Ivlev, V. F., and V. M. Rudyak [Teachers Institute, Krasnoyarsk]. Measuring the Coercive Force by the Barkhausen Jump Method 143

Savchenko, M. K., and A. M. Rodichev [Institute of Physics, Siberian Branch AS USSR, Krasnoyarsk]. Simultaneous

Magnetic Structure (Cont.) SOV/5526

Observation of the Domain Structure and the Barkhausen Effect 147

Rodichev, A. M., and M. K. Savchenko [Institute of Physics, Siberian Branch AS USSR, Krasnoyarsk]. Mechanical Barkhausen Effect in Monocrystals of Transformer Steel 151

Puzey, I. M., V. M. Lutoshkin, and A. I. Rad'kov [TsNIIChERMET - Central Scientific Research Institute of Ferrous Metallurgy]. Study of the Dynamics of the Domain Structure in an Ultrasonic Field 155

Kirenskiy, L. V., A. I. Drokin, and V. S. Cherkashin [Institute of Physics, Siberian Branch AS USSR, Teachers Institute, Krasnoyarsk]. Effect of Ultrasound on Magnetic Properties of Ferromagnetic Substances at Various Temperatures 165

Cherkashin, V. S. [Institute of Physics, Siberian Branch AS USSR, Krasnoyarsk]. Effect of Rapidly Changing Stresses

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[illegible], M.K.

AUTHOR: Kuznetsov, V.Ye. SOV-26-58-11/9/49

TITLE: Investigations of the Magnetic Structure of Ferromagnetics (Issledovaniya magnitnoy struktury ferromagnetikov). An All-Union Conference in Krasnoyarsk (Vsesoyuznoye soveshchaniye v Krasnoyarske).

PERIODICAL: Priroda, 1958, Nr 11, pp 53-55 (USSR)

ABSTRACT: In June 1958 an All-Union meeting on the magnetic structure of ferromagnetics was convoked by the Institut fiziki AN SSSR (Institute of Physics of the AS USSR) and the Komissiya po magnetizmu Otdeleniya fiziko-matematicheskikh nauk AN SSSR (Commission for Magnetism of the Department of Physico-Mathematical Sciences of AS USSR) in Krasnoyarsk. The meeting was attended by representatives of scientific institutions of many principal cities of the USSR. A total of 32 papers were read. Ya.S. Shur of the Institut fiziki metallov AN SSSR (Institute of the Physics of Metals, AS USSR) in Sverdlovsk summarized the magnetic structure of ferromagnetics. G.V. Spivak of the Moskovskiy gosudarstvennyy universitet (Moscow State University) told of present and future electron-optical methods of study of the domain structure of ferromagnetics. L.V. Kirenskiy and M.K. Savchenko of the Institute of Physics of the AS USSR in Krasnoyarsk presented new data on the spatial distribution of the domain structure in samples of transformer iron. A.I.

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Investigations of the Magnetic Structure of Ferromagnetics SOV-26-58-11-9/49

Sudovtsev and Ye.Ye. Semenenko of the Fiziko-technicheskiy institut AN USSR (Physico-Technical Institute of AS UkrSSR) in Khar'kov read a paper on the influence of the domain structure on the electrical conductivity of very pure iron. G.V. Spivak, V.Ye. Yurasova and Ye.I. Shishkina of Moscow University presented an original method of exposure of magnetic heterogeneity in metal. T.I. Prasova of the Verkh-Isetskiy metallurgicheskiy zavod (Verkh-Isetskiy Metallurgical Plant) told of experimental work carried out in cooperation with V.V. Druzhinin on the application of the method of powder patterns to the study of the magnetic properties of transformer steel. G.P. D'yakov of Moscow University spoke on the calculation of the domain structure in the theory of magnetization and magnetostriction of monocrystals. L.V. Kirpenskiy and I.F. Degtyarev of Krasnoyarsk read a paper on the temperature dependence of the domain structure of crystals of ferrosilicon. V.A. Zaykova and Ya.S. Shur reported on the results of a study of the influence of elastic stresses on the magnetic structure of the crystals of ferrosilicon. V.V. Veter of the Institute of Physics of the AS USSR in Krasnoyarsk reported on his original work conducted together

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Investigations of the Magnetic Structure of Ferromagnetics

with L.V. Kirenskiy on the determination of the width of the domain boundary; the method had been suggested by G.S. Krinchik. I.M. Puzey of the Tsentral'nyy nauchno-issledovatel'skiy institut chërnoy metallurgii, Moskva (Central Scientific Research Institute of Iron Metallurgy, Moscow) communicated the results of studies of the dynamics of the domain structure in a frequency range of up to several mhz. A.I. Drokin, D.A. Laptey, and R.P. Smolin (Krasnoyarsk) presented results of their studies of the temperature magnetic hysteresis on the points of the hysteresis loop. Nickel and iron-nickel alloy samples had been studied for this purpose. I.Ye. Startseva and Ya.S. Shur read a study of the structure of the residual magnetized ferromagnetic by aid of the method of powder patterns, and the change of this structure under the influence of a changing magnetic field. The papers of L.V. Kirenskiy, A.I. Drokin and V.S. Cherkashin dealt with the results of the influence of ultrasonic waves on the magnetic properties of ferromagnetics at various temperatures. Several papers were devoted to further investigations of the

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SOV-26-58-11-9/49

Investigations of the Magnetic Structure of Ferromagnetics

Barkhausen effect, the concept of which has been considerably extended by such Soviet researchers as R.V. Telesnin, Ye.P. Dzaganiya, V.F. Ivlev and others. Several papers dealt with transitional magnetic structure and temperature changes. The Physical Institute of the AS USSR in Krasnoyarsk, in 1957 opened the Stolby Game Reservation. The construction site of the Krasnoyarsk Hydroelectric Power Station was visited by the scientists.

1. Magnetostriction--Properties

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AUTHORS: Kirenskiy, L. V., Savchenko, M. K., Rodichev, A. M. SOV/48-22-10-4/23

TITLE: Dynamics of Domain Structure in Crystals of Transformer Sheet Iron Under the Influence of Tensions (Dinamika domennoy struktury v kristallakh transformatornoy stali pod deystviyem napryazheniy)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1958, Vol 22, Nr 10, pp 1181 - 1184 (USSR)

ABSTRACT: By means of the powder patterns by Akulov, Dekhtyar, and Bitter (Ref 1) in the present paper the effect of elastic strain on the domain structure of the crystals of cold-rolled transformer sheet iron (3,4% Si) was investigated. It was shown that the domain structure changes considerably when a strain is applied. The character of these changes depends on the orientation of the stress. On the crystal surface that coincides with the plane (110) the powder pattern has the form of parallel lines. These lines have the direction of the axis of the weak magnetization which is next to the surface. This speaks for the fact that the domain structure consists of plane-parallel layer domains.

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Dynamics of Domain Structure in Crystals of Transformer Sheet Iron Under the Influence of Tensions

SOV/48-22-10-4/23

These layer domains are oriented in the direction of the powder lines and are magnetized in the same direction. The plane-parallel layer domains never exhibit the same width in one and the same sample. The application of the stress to the sample compensates for the whole tension in the sample and thus also for the domain structure. During strain application sometimes a separation of the layer domains into two halves can be observed. This separation comes as a consequence of new boundaries, (Fig 1). It must be mentioned that the remagnetization of a number of domains is not caused by the dislocation of the boundary but apparently by a sudden inversion of whole domains. Tensions that are directed along the axis (110) in the crystal completely rebuild the original structure of the domains. If the stress is sufficiently high two new types of figures appear (Fig 2). For reasons of comparison also finely crystalline samples with a linear grain dimension of 1 - 1,5 mm were observed. A more or less simple law connecting the width and the magnitude of the stress could not be found.

Dynamics of Domain Structure in Crystals of Transformer Sheet Iron Under the Influence of Tensions

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As was observed, the domain structure changes when the stress is oriented along the direction of the complex magnetization as well as when it is directed along the axis of the weak magnetization. In crystals the surface of which coincides with the plane (100) a change of the domain structure of the closed type was observed when a strain was applied. Reproductions of powder patterns show that the layered structure of the ferromagnetic domains must exhibit closed domains for excluding the formation of free stray-fields. The powder pattern method alone is not perfect and may be applied more successfully if it is combined with another method. In the present paper apart from observations of powder patterns also the Barkhausen (Barkgauzen) jumps were recorded. Figure 4 shows the results. There are 4 figures and 2 references, 1 of which is Soviet.

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75991
SOV/70-4-5-13/36

AUTHORS: Kirenskiy, L. V., Savchenko, M. K.

TITLE: Domain Forms in Ferromagnetic Crystals

PERIODICAL: Kristallografiya, 1959, Vol 4, Nr 5, pp 702-709 (USSR)

ABSTRACT: Having cited some interpretation possibilities on the basis of existing theoretical models, the authors note that the forms and dispositions of ferromagnetic domains in real crystals are more complicated than in theoretical models, but no means are available to observe them in the interior parts of crystals directly. They observed domain boundaries simultaneously on the opposite sides of specimens by a set of two metallographic microscopes see (Fig. 1), in order to see whether or or not the domain walls completely penetrate the specimens. The sheets of a transformer steel, 30-40 mm long, 6 mm wide and max 0.4 mm thick, were electropolished and vacuum annealed at 1,000° to

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Domain Forms in Ferromagnetic Crystals

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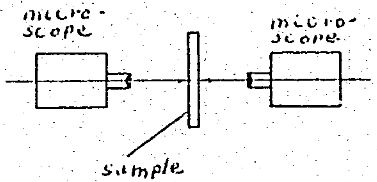

Fig. 1.

1,100° C for 3 hr. Then, the crystals with (110) planes parallel to the sheet surface were cut along /̄001_7. The domain boundaries on the opposite sides of crystals, especially of those whose (100) planes coincided with the sheet surface, proved to have entirely different patterns. Obviously, the domains, exposed at one surface, do not extend to the opposite surface, but end somewhere within the sheet. Electropolishing the

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sheets and observing the domain boundaries from time to time, one observed that the sheet thicknesses were gradually reduced to a critical value of 0.08 mm, at which the domain boundaries on the opposite surfaces became identical. The exposures of the domain termini on the surfaces of sheets of intermediate thicknesses, 0.5 to 0.2 mm, indicated that the domains are not always platy, but may have the form of wedges, trapezohedra, etc. Except for a few cases, the experiments confirmed the theory suggested by C. D. Graham and P. W. Neurath, that the domain walls in the crystals, oriented with (110) parallel to the sheet surface, are inclined under 32° to the surface normal, i. e. are oblique to the magnetization axis running under 45° to the sheet surface, and that tension stresses parallel to the sheet surface turn the domain walls closer to the surface normal or even parallel to it. This turn could be determined according to the change of the displacement of a domain boundary relative to its position on the other surface at various tension stresses. If domains penetrate the sheet, a uniform

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magnetization can be accomplished at weak magnetic fields. If domains end within the sheet, the magnetization is more rapid in the regions of larger domains. There are 8 figures; and 6 references, 4 Soviet, 1 U. S., 1 French. The U. S. reference is: C. D. Graham and P. W. Neurath, J. Appl. Phys., 8, 881 (1957).

ASSOCIATION: Krasnoyarsk Institute of Physics of the Siberian Branch of the Academy of Sciences of the USSR (Krasnoyarskiy institut fiziki Sibirskogo otdeleniya, AN SSSR)

SUBMITTED: March 31, 1959

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SOV/56-37-3-5/62

24(3)

AUTHORS: Kirenskiy, L. V., Savchenko, M. K., Degtyarev, I. F.

TITLE: On Magnetization Processes in Ferromagnetic Substances

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 3(9), pp 616 - 619 (USSR)

ABSTRACT: It was the aim of the present paper experimentally to investigate the dynamics of the domain structure during magnetization; the authors worked with silicon iron crystals with a silicon content of 3%; the samples had the shape of plates (30×6 mm^2) or disks (20 mm diameter), the thickness of the samples was 0.3 mm or less. The surface of the samples coincided exactly or nearly with the (110) plane, the longitudinal side of the plates with the [001]-direction. The samples were vacuum-tempered at 1000°C for 2-3 hours, after which they were slowly cooled down in the furnace and electropolished. The change of the domain structure in the magnetic field in the case of growing H was investigated by the method of powder figures and by the method of the meridional magneto-optic Kerr effect. For visual and photographic observation the samples were covered with a uniform iron oxide layer; by means of the

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former method domain structure observation was carried out simultaneously on opposing sides of the sample by means of two MIM-6-type microscopes. The results obtained are shown by numerous photographs. Thus, figure 1 shows 20 photos of the change of the domain structure in the case of varying field voltage ($\vec{H}$ forms an angle of 55° with the [100] - direction). The H-values are between 0 and 290 Oe. Figure 2 in 28 photographs shows the same for $\vec{H} \perp [100]$ and up to H= 415 Oe, and figure 3 shows in a growing magnetic field the variation of the domain structure on opposing crystal surfaces (10 photographs). It was found that, in general, magnetization causes a shift of inter-domain boundaries, a structural variation, a rotation of the magnetization vector towards the field direction, as well as a paraprocess. The process of rotation closes the process of technical magnetization, and the process of the shifting of boundaries precedes the change of domain structure. The principle part is played by the reconstruction of the domains, which is accompanied by a large number of Barkhausen-jumps. There are 3 figures and 7 references, 5

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of which are Soviet.

ASSOCIATION: Institut fiziki Sibirskogo otdeleniya Akademii nauk SSSR (Institute of Physics of the Siberian Branch of the Academy of Sciences, USSR)

SUBMITTED: March 31, 1959

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SOV/20-128-2-18/59

24(3)

AUTHORS: Kirenskiy, L. V., Savchenko, M. K., Degtyarev, I. F.

TITLE: On Industrial Magnetization of Ferromagnetics

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 2, pp 288-290 (USSR)

ABSTRACT: According to modern concepts, industrial magnetization consists in a shift of the boundaries between the domains and rotation. Investigations of the variation in the domain structure, however, showed that the process of magnetization usually cannot be described only by translation and rotation. Besides these two processes, an additional process was frequently found which may be reduced to the re-formation of the domain structure. Rotation completes industrial magnetization, and the boundaries are shifted before re-formation of the domain structure. In this article the authors report on the above re-formation. Experiments were made by means of iron crystals with a silicon content of 3%. The samples had a diameter of 20 mm and a thickness of 0.3 mm and less. The surface of the samples agreed with the crystallographical plane (110). They were annealed in vacuum for two or three hours, then slowly cooled

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and electrically polished. The variations in the domain structure within a magnetic field of rising strength were investigated with the help of the powder pattern and the magneto-optical Kerr effect. 24 figures illustrate the structure of domains determined by the magneto-optical method on magnetization in various directions of the sample plane. In the absence of a field, the original pattern is composed of parallel light and dark stripes. The latter correspond to the domains which are magnetized along and opposite to the horizontal light axis [001]. On magnetization the domain structure varies differently in the individual directions. On magnetization along the light axis only a shift of the boundaries by 180° is observable. If just the same sample is magnetized toward the light axis at an angle of 55°, primarily a widening of the light stripes is visible at field strengths of up to 100 oersteds, i.e. a shift of the boundaries. At field strengths of from 100 to 200 oersteds, the domain structure is re-formed. Visual observation clearly indicates that this is an abrupt variation. Further increase to 300 oersteds shifts the boundaries between the domains of the new structure. A variation in the domain structure on magnetization at an angle of 90° toward the light axis is still

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more complicated, i.e. in the direction [110]. In this case, practically no shift is recorded. At field strengths of up to 90 oersteds, the domain structure practically does not vary. At further increase in the field strength (e.g. from 90 to 200 oersteds), the structure changes to produce a new kind of domain in the form of intermittent stripes. Still further increase of field strength results in a subdivision of the domains, and the pattern assumes the shape of curved stripes in the main direction along the axis [110]. At decreasing field strength, the process develops the other way round. Magnetization by re-formation of the domain structure proceeds the more strongly the nearer the angle to 90° between the directions of the light axis and the magnetizing field. There are 2 figures and 4 Soviet references.

ASSOCIATION: Institut fiziki Sibirskogo otdeleniya Akademii nauk SSSR (Physics Institute of the Siberian Branch of the Academy of Sciences, USSR)

PRESENTED: May 22, 1959, by A. V. Shubnikov, Academician

SUBMITTED: May 14, 1959

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S/196/61/000/010/002/037
E194/E155

AUTHORS: Kirenskiy, L.V., and Savchenko, M.K.

TITLE: The spatial distribution of domain structures in ferro-magnetics

PERIODICAL: Referativnyy zhurnal, Elektrotekhnika i energetika, no.10, 1961, 2, abstract 10B 5. (Symposium "The magnetic structure of ferromagnetics", Novosibirsk, Siberian Division AS USSR, 1960, 25-28)

TEXT: In real ferromagnetics the crystals of the domain structure do not form plane-parallel layers throughout the entire thickness of the crystal. In laminar crystals whose main surface coincides with the plane (110), the domain structure consists of parallel layers directed along the axis (001) but they do not penetrate throughout the crystal thickness. On the opposite side of the laminae the powder figures are usually different. In laminar crystals whose main surface coincides with the plane (100), the domain structure consists of layers directed along one of the axes of magnetisation. This layer does not usually

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S/058/61/000/012/067/083
A058/A101

AUTHORS: Savchenko, M.K., Rodichev, A.M.

TITLE: Concerning simultaneous observation of domain structure and Barkhausen effect

PERIODICAL: Referativnyy zhurnal. Fizika, no. 12, 1961, 385-386, abstract 12E703 (V sb. "Magnitn. struktura ferromagnetikov", Novosibirsk, Sib. otd. AN SSSR, 1960, 147 - 150)

TEXT: The distribution of Barkhausen jumps incident to tension (in three principal directions) was measured in single-crystal and polycrystalline specimens of cold-rolled steel (3% Si). At the same time, domain structure was studied by means of powder figures. It was found that Barkhausen jumps appear not only as a result of irreversible boundary shifts due to the presence of nonmagnetic enclaves and stresses, but also as a result of the rebuilding of domain structure that takes place incident to application of stresses and during remagnetization.

L. Vinokurova

[Abstracter's note: Complete translation]

Card 1/1

BURAVIKHIN, V.A.; SAVCHENKO, M.K.

Change in the domain structure of iron silicide effected by the action of a current field. Izv. Sib. otd. AN SSSR no. 10:133-135 '60. (MIRA 13:12)

1. Institut fiziki Sibirskogo otdeleniya AN SSSR i Krasnoyarskiy pedagogicheskiy institut.

(Iron silicide)

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S/058/61/000/012/069/083
A058/A101

24.2200 (1068, 1147, 1164)

AUTHORS: Rodichev, A.M., Savchenko, M.K.

TITLE: Mechanical Barkhausen effect in transformer-steel single crystals

PERIODICAL: Referativnyy zhurnal. Fizika, no. 12, 1961, 386, abstract 12E705 (V sb. "Magnitn. struktura ferromagnetikov", Novosibirsk, Sib. otd. AN SSSR, 1960, 151 - 153)

TEXT: The dependence of the mechanical Barkhausen effect on the rate of change of the load $d\sigma/dt$ incident to tension was studied in [100] axis-cut single crystals of transformer steel. It was found that the number of Barkhausen jumps depends on how many preliminary tension cycles the specimen has undergone, so only the results of the first cycle after annealing were fixed (beginning with 0.3 kg/mm^2). There were obtained curves for the integral and differential distributions in amplitude of the number of jumps for different $d\sigma/dt$. The mean and the most probable amplitudes of the jumps were computed. It was established that with increasing $d\sigma/dt$ the number of jumps decreases while their amplitude increases. The obtained distribution of jumps in amplitude incident to tension is analogous

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A058/A101

to that of the Barkhausen jump incident to magnetization, and the effect accompanying a change in $d\sigma/dt$ is analogous to that accompanying a change in dH/dt.

L. Vinokurova

[Abstracter's note: Complete translation]

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32218
S/139/61/000/004/008/[illegible]
E073/E535

24,2200 (1147, 1164, 1160)

AUTHORS: Kirenskiy, L.V., Buravikhin, V.A. and Savchenko, M.K.

TITLE: Domain structure of thin ferromagnetic films inside a magnetic field

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika, no.4, 1961, 52-55 + 3 plates

TEXT: A. A. Fowler, E.M. Fryer, Z. Stevens (Ref.1: Phys. Rev., 104, 645, 1956) observed photographically, by means of the method of superposition, the remagnetization of domains in a reverse field in films 5000, 2500 and 500 Å thick of an alloy of 20% Fe and 80% Ni. H. Williams and R. Sherwood (Ref.2: J.Appl. Phys., 28, 548, 1957) have detected the configuration of domains in demagnetized films of pure metals and a number of alloys: they also described the germination and growth of domains in films of cobalt and of the alloy Fe-Ni-Mo. By the same method C.E.Fuller (Ref.3: J.Phys. et. radium, 20, No.2-3, 310-317, 1959, Discuss., 317-318) investigated the process of remagnetization in films of iron (400 Å) and 20% Fe and 80% Ni (900 Å) by a magnetic field applied during the process of producing the films in directions

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order of 100 Oe

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The direction of the field was the same as the plane of the film. Each time the alloy from the crucible evaporated completely. The direction of easy magnetization of the films coincided with the direction of the field at the instant of deposition. The following conclusions are arrived at:

1. In most cases no domain structure was observed without preliminary demagnetization in Fe-Ni-Mo alloy films, obtained by evaporation in vacuum in the presence of a magnetic field in the same direction as the film plane. The appearance of the domain structure after demagnetization of the films depends to a great extent on the direction of the demagnetizing field relative to the axis of easy magnetization. When the angle is increased, the number of boundaries and the domains become narrower.

2. Within a considerable range of fields the domain structure remains stable for demagnetized films. A further increase in the field within a narrow interval brings about changes in the domain structure; if the films are sufficiently thick (2600 Å), the change in the domain structure is accompanied by a displacement of the boundaries, in the same way as in massive ferromagnetic crystals. In thinner films almost no displacement of the

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boundaries is observed and fracture occurs. It is attributed to the sudden remagnetization of considerable parts of the domains, which are not suitably oriented relative to the field. Such a remagnetization is apparently due to a sudden rotation of the magnetization vector in the section being remagnetized. There are 4 figures and 5 references: 1 Soviet and 4 non-Soviet. The English-language references are quoted in the text.

4

ASSOCIATION: Institut fiziki SO AN SSSR, Krasnoyarskiy pedinstitut (Physics Institute SO AS USSR, Krasnoyarsk Pedagogic Institute)

SUBMITTED: July 20, 1960

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SALANSKIY, N.M.; RODICHEV, A.M.; SAVCHENKO, M.K.

Barkhausen effect in thin films of molybdenum and permalloy.
Izv.Sib.otd.AN SSSR no.4:110-113 '61. (MIRA 14:6)

1. Institut fiziki Sibirskogo otdeleniya AN SSSR, Krasnoyarsk.
(Barkhausen effect)
(Permalloys)
(Molybdenum)

KIRENSKIY, L.V.; BURAVIKHIN, V.A.; SAVCHENKO, M.K.

Motion-picture photography of processes in the change of the magnetic structure of thin ferromagnetic films in a magnetic field. Fiz. met. i metalloved. 11 no. 4:529-532 Ap '61. (MIRA 14:5)

1. Institut fiziki Sibirskogo otdeleniya AN SSSR i Krasnoyarskiy pedagogicheskiy institut.
(Motion-picture photography) (Ferromagnetism)

25794
S/048/61/025/005/008/024
B104/B201

24.2200

AUTHORS: Kirenskiy, L. V., Buravikhin, V. A., and Savchenko, M. K.

TITLE: Modification of the domain structure of ferromagnetic films in a magnetic field

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 25, no. 5, 1961, 596-598

TEXT: The present investigation was the subject of a lecture delivered at a symposium on thin ferromagnetic films (Krasnoyarsk, July 4 to 7, 1960). The authors studied the behavior of the domain structures of thin films obtained from two alloys (80% Ni, 17% Fe, 3% Mo; and 50% Fe, 50% Ni) in a magnetic field during magnetization and magnetic reversal along the direction of easiest magnetizing. The domain structure was observed by the magnetic powder method. The modifications of the domain structure with magnetic reversal were recorded by a motion-picture camera (12 pictures per second). These pictures show that the domain structure of well demagnetized 2470 Å specimens of the Fe-Ni alloy is not modified up to a magnetization field strength of 9.3 oersteds. In case of massive

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Modification of the domain ...

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specimens the displacement of the domain boundaries begins already at very low field strengths. A further rise of the field strength is accompanied by a displacement of boundaries at a varying rate. A saturation is attained at 17.6 oersteds. Similar results were obtained on a specimen of the same alloy having a thickness of 760 Å. In experiments on the magnetic reversal of Fe-Ni films, the latter were first magnetized up to saturation. When applying the reverse field no domain structure was observed up to - 3.4 oersteds. At -3.5 oersteds wedge-shaped boundaries appeared, which separated the domains of reverse magnetization. Up to -6.5 oersteds no modification of this domain structure was observed. The wedges grew in a field of 7 oersteds, and their magnetization coincided with the field. The domain structure disappeared at -16 oersteds. Films of Fe-Ni-Mo alloy, 1200 Å thick, were examined in a magnetic field which was oriented at angles of 0, 45, and 90° to the direction of easiest magnetizing. In the first case they presented no modification of the domain structure up to 10.5 oersteds, in the second case up to 12.6 oersteds, and in the third case up to 13 oersteds. In case of a slight increase of the magnetic field strength, a slight displacement of the boundaries was observed in the first and in the second case; on a

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further stronger rise of the magnetic field strength a fast magnetic reversal was observed in parts of the domain structure, the magnetization of which was oriented in opposite direction to the field. In the third case, a displacement of boundaries was hardly observable. The magnetic reversal took place by rotational processes. Saturation was attained at 11.6, 15, and 15.8 oersteds. To summarize: (1) all ferromagnetic films display a domain structure that is stable within certain values of the magnetic field strength; (2) in relatively thick films the magnetic reversal takes place by a displacement of boundaries, which begins after a critical field strength value; (3) with a decrease of the film thickness magnetization occurs in a determined field strength range by boundary displacement and rotational processes. In very thin films magnetization occurs by very fast magnetic reversal of unfavorably oriented domains. There are 4 figures and 7 references: 1 Soviet-bloc and 6 non-Soviet-bloc.

ASSOCIATION: Institut fiziki Sibirskogo otdeleniya Akademii nauk SSSR (Institute of Physics of the Siberian Department, Academy of Sciences USSR), Krasnoyarskiy gos. pedagogicheskiy institut (Krasnoyarsk State Pedagogic Institute)

22344

S/200/61/000/004/004/005
D228/D305

18.1140

AUTHORS: Salanskiy, N. M., Rodichev, A. M., and Savchenko, M. K.

TITLE: The Barkhausen effect in thin molybdenum-permalloy plates

PERIODICAL: Akademiya nauk SSSR. Sibirskoye otdeleniye. Izvestiya, no. 4, 1961, 110-113

TEXT: This is a report on a series of experiments investigating the influence of many factors on the "Barkhausen discontinuities" or so called "Barkhausen steps" in thin molybdenum-permalloy plates, namely the dependence of the number of "steps" on the thickness of strip and rate of change of the magnetic field and the dependence of mean magnetic moments of steps on the thickness of the strip. The distribution of steps according to magnetic moments was also examined as well as the strength of the magnetic field, influence of direction of reverse magnetization in respect to the anisotropic axis of strips and the influence of annealing in the presence or absence of a magnetic field. After describing how the Barkhausen

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The Barkhausen effect...

effect was measured, the authors point out that the distribution of Barkhausen "discontinuities" or so called Barkhausen "steps" according to the moments is analogous with distribution in ferromagnetics not only as regards the character but also as the absolute values of the moments. If it is assumed that the area of the step envelops the whole thickness of the strip, for the strip of thickness 600 Å "steps" from 0.6 to $9.0 \cdot 10^{-6}$ cgsm units occupy respectively an area of 0.01 - 0.15 mm^2 on the surface of the strip. Distribution of steps accordingly to magnetic moments in all strips is expressed by

$$N = N_0 e^{-am^{\frac{1}{2}}} \quad (1)$$

where N_0 and a are constant for a given strip. The mean moment of steps depends on the thickness of the strip and in the range of thicknesses examined, it increases linearly with an increase of thickness, as if the area dimensions reversely magnetized by the step in the plane of the strip did not change and only the dimension along the thickness of the strip increases. Dependence of the mean moment of steps on the presence or absence of a magnetic

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The Barkhausen effect... S/200/61/000/004/004/005
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field during annealing was not observed. The dependence of the number of steps on the thickness of strip is illustrated. The rate of increase of the number of steps with an increase in thickness is greater for strips annealed in the field than for strips annealed without a field. Extrapolation of these curves gives the disappearance of the Barkhausen effect for a thickness of 350 Å. Taking into consideration that the dimensions of steps decrease with the decreasing thickness of the strip and that some of them may be below the sensitivity of the equipment, a thickness of 350 Å should be considered as greater than the criterion of one domain. The distribution of steps according to the strength of magnetic field "H" is also given in graphic form. In contrast to ferromagnetics, for which steps appear in negative fields (when the field changes from negative to positive) steps in strips appear in positive fields and the range of fields where steps appear is smaller for strips. In conclusion the possibility of employing certain characteristics of the Barkhausen effect as a criterion of the rate of impulse reverse magnetization of strips is suggested. One step reversely magnetizes a strip at very high speed. Non-syn-

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The Barkhausen effect...

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D228/D305

chronism of reverse magnetization of different parts of a strip has a retarding effect. For a large number of steps, it is desired that these have critical fields as close as possible to each other so that the distribution of steps according to the field could be represented by a tight curve. The authors feel that the duration of steps appears dependent on the characteristics of impulse reverse magnetization and further experiments in this direction could be useful. There are 5 figures and 3 non-Soviet-bloc references. The references to the English-language publications read as follows: R. S. Tebble, I. C. Skidmore and W. D. Corner, Proc. Phys. Soc. A63, 739 (1950), N. C. Ford and E. W. Pugh. Journ. Appl. Phys. 30, 4, Suppl. 270 (1959).

ASSOCIATION: Institut fiziki Sibirskogo otdeleniya AN SSSR Krasnoyarsk (Institute of Physics, Siberian Division AS USSR, Krasnoyarsk)

SUBMITTED: August 12, 1960

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21358

24.2200 (1137, 1158, 1147)
18.7530 1145, also 1164, 1160

S/126/61/011/004/005/023
E073/E535

AUTHORS: Kirenskiy, L. V., Buravikhin, V. A. and Savchenko, M.K.

TITLE: Motion Picture Study of the Processes of Changes in the Magnetic Structure of Thin Ferromagnetic Film in a Magnetic Field

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.4, pp.529-532 + 2 plates

TEXT: Changes in the domain structure of thin films of two alloys (50% Fe, 50% Ni and 17% Fe, 80% Ni, 3% Mo) were studied by means of motion picture photograpny, using the powder pattern method. The films were produced on a polished glass base 1 x 10 x 40 mm heated to 350°C by thermal deposition in a vacuum of 7 x 10^{-6} mm Hg applying an external magnetic field of 100 Oe. In every case the alloy evaporated from the crucible in 30 sec, which was taken as an indication that the composition of the ferromagnetic films differed only very slightly from the initial composition of the alloy. The film thickness varied between 760 and 2470 Å. Study of the photographs indicates that the features of magnetization of thin ferromagnetic films can be summarized as follows:

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Motion Picture Study of the ... 21358
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1. The domain structure of all ferromagnetic film remains stable until the magnetic field reaches some critical value;
2. In relatively thick films, magnetization occurs with intermittent displacement of domain boundaries when the magnetic field reaches a critical value;
3. No boundary displacement was observed in thinner films; their magnetization takes place by destroying domain boundaries and, in some cases, there was a change in their structure or appearance of new boundaries, which sub-divided the unsuitably oriented domains into individual sub-domains. There is also a change in the structure of the main boundaries. There are 4 figures and 8 references: 2 Soviet and 6 non-Soviet.

ASSOCIATIONS: Institut fiziki SO AN SSSR
(Institute of Physics SO AS USSR);
Krasnoyarskiy pedagogicheskiy institut
(Krasnoyarsk Pedagogic Institute)

SUBMITTED: September 10, 1960

Card 2/2

24.3600

25795
S/048/61/025/005/009/024
B104/B201

AUTHORS: Sinegubov, V. I. and Savchenko, M. K.

TITLE: A new method of measuring the width of the boundary between the domains with the aid of the Kerr effect

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 25, no. 5, 1961, 599-601

TEXT: The present investigation was the subject of a lecture delivered at a symposium on thin ferromagnetic films (Krasnoyarsk, July 4 to 7, 1960). The determination of the width of the boundary and its energy is here designated as one of the main problems in the theory of ferromagnetism. Variations of these quantities play an important part in technical magnetization. Theoretical and experimental studies by L. D. Landau and Ye. M. Lifshits (Sow. Phys., 8, 153 (1935)), K.P. Bin (Izv. AN SSSR, 21, 8, 1183 (1957)), L. V. Kirenskiy and V. V. Veter (Dokl. AN SSSR, 125, 526 (1959)) are discussed, and A. A. Shvarts is also mentioned. A new method of investigation is suggested here, which allows obtaining pictures of boundaries and their width with the aid of the Kerr

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effect. The experimental arrangement is schematically shown in Fig. 1. Specimen 4 is fastened onto the specimen holder of a microscope, and light source 1 emits modulated light. After passing through polarizer 3 it is reflected from the specimen and passes through analyzer 5. Next, it passes through micrometer slit 6 and reaches a photomultiplier 7. The signal of this photomultiplier is amplified and led to a phase detector. Rigorously in phase with the useful signal, a reference pulse is fed to the phase detector from a multivibrator. A recording device 12 records the measured values. The specimen holder is shifted at a low uniform velocity. The domain structure is first examined with the aid of the powder method, and a suitable spot is chosen. The modulated light beam is then directed onto this spot. The light beam reflected from the specimen produces a picture of the specimen surface in the plane of the micrometer slit. If polarizer and analyzer are crossed, the visual field of the analyzer is dark, and no signal is given by the photomultiplier. Only if a boundary reaches the slit, a signal will appear at the detector output; its shape is shown in Fig. 2. Sections 1 and 5 indicate the noise of the photomultiplier; in section 2 the boundary reaches the slit; in section 3 the boundary passes through the slit, and in section 4 the

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A new method of measuring the width ...

boundary leaves the slit. The width of the boundary can be determined from this diagram. This method was applied to measure the boundary on a 2500-Å film (Mo permalloy) sputtered in vacuum ($4.5 \cdot 10^{-5}$ mm Hg) on a glass backing (300°C). The boundary was found to be 0.7μ. There are 3 figures and 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc. The reference to English-language publications reads as follows: Craik, D.J., Proc. Phys. Soc., 69, 6, 438 (1956).

ASSOCIATION: Institut fiziki Sibirskogo otdeleniya Akademii nauk SSSR (Institute of Physics of the Siberian Department, Academy of Sciences USSR)

Card 3/5

24,2200

25796
S/048/61/025/005/010/024
B104/B201

AUTHORS: Salanskiy, N. M., Rodichev, A. M., and Savchenko, M. K.

TITLE: Barkhausen effect in thin molybdenum permalloy films

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 25, no. 5, 1961, 602-605

TEXT: The present investigation was the subject of a lecture delivered at a symposium on thin ferromagnetic films (Krasnoyarsk, July 4 to 7, 1960). In the course of the experiments reported here, the films were inserted into a test coil, the outputs of which were connected to a broad-band amplifier. The magnetic reversal was attained by a continuous change of the current in a magnetic coil which was arranged coaxially with the test coil. The changing velocity was varied within a wide range. Behind the amplifier the Barkhausen pulses were integrated electronically and sorted by an eight-channel integral pulse discriminator with respect to the magnetic moments. The system allowed recording magnetic moments of $0.56 \cdot 10^{-6}$ CGSM units and over. The films (80% Ni, 17% Fe, 3% Mo) were prepared by sputtering onto glass backings (300°C) in vacuum ($4 \cdot 10^{-5}$mm Hg),

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and thereafter annealed at 300°C in the same vacuum. Eight films (25 • 2 mm) were prepared. Four films, no. 1 (600 Å), no. 2 (750 Å), no. 3 (850 Å), and no. 4 (1200 Å) were annealed in the laboratory in the presence of the natural magnetic field; three films, no. 5 (600 Å), no. 6 (750 Å), and no. 7 (1200 Å) were annealed in a 100-oe magnetic field which was oriented in the direction of the long side; film no. 8 (1200 Å) was annealed with a 100-oe field, oriented in perpendicular to the long side of the specimen. A disk-shaped specimen (no. 9, 11 mm in diameter) was likewise annealed in a 100-oe magnetic field. Easiest magnetizing was in all films, with the exception of no. 8, directed along the long side of the film. In case of no. 8 easiest magnetizing was directed in perpendicular to the long side. The specimens 1 - 8 were inserted with their long side in parallel to the axis of the test coil. The investigation was extended to the distribution of jumps according to their moments, jumps as a function of the film thickness, the distribution of jumps according to the field strength, and the number of jumps as a function of the rate of magnetic field change. The results are presented in diagrams. It is stated in conclusion that some of the characteristics of the effect may be used as criteria of the rate of pulsed magnetic reversal of the

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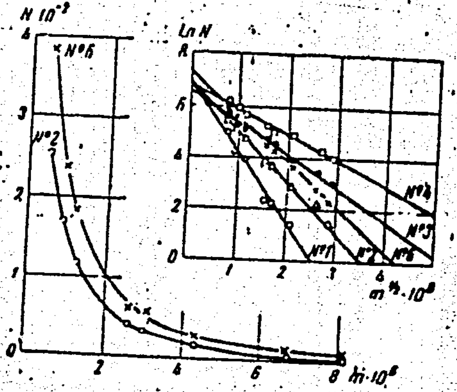
films. The fastest film underwent magnetic reversal with one jump. The nonsynchronous magnetic reversal of individual parts of the film increases the time of magnetic reversal. The authors believe that the duration of the jumps is closely related to the characteristics of pulsed magnetic reversal. There are 5 figures and 3 non-Soviet-bloc references.

ASSOCIATION: Institut fiziki Sibirskogo otdeleniya Akademii nauk SSSR (Institute of Physics, Academy of Sciences USSR)

Fig. 1: Integral jump distribution versus magnetic field strength for specimens nos. 2 and 6.



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25806 S/048/61/025/005/020/024
B117/B201

24,2200

AUTHORS: Sudakov, N. I., Savchenko, M. K., Zagirova, Ye. K., and Starostin, I. I.

TITLE: Measurement of hysteresis losses in a rotating magnetic field in thin films

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 25, no. 5, 1961, 643-646

TEXT: The present investigation was the subject of a lecture delivered at a symposium on thin ferromagnetic films (Krasnoyarsk, July 4 to 7, 1960). Hysteresis losses were measured in the rotating field, and anisotropy constants in thin permalloy films were measured by the method of rotational moments. The magnetic field was created with the aid of an electromagnet designed at the fizicheskaya laboratoriya Krasnoyarskogo instituta tsvetnykh metallov im. M. I. Kalinina (Physical Laboratory of the Institute of Nonferrous Metallurgy imeni M. I. Kalinin) and built at the Krasnoyarskiy zavod tyazhelogo mashinostroyeniya (Krasnoyarsk Heavy Machine Building Plant). The mechanical moments acting in the magnetic

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Measurement of hysteresis losses in... S/048/61/025/005/020/024
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field upon a disk-shaped ferromagnetic film were measured by an anisometer developed by N. S. Akulov. The high sensitivity of the anisometer was achieved with a thin long tungsten suspension wire 0.1 mm in diameter and 0.5 m long. The scale for reading the rotation angle of the mirror was at a distance of 4.05 m from the anisometer. For the purpose of protecting against air movements the whole rotation system was placed into a duralumin housing with a light entry window made of glass. Experiments were conducted with permalloy films 400, 800, and 1300 Å thick. The films were prepared by thermal sputtering of molybdenum permalloy (80 % Ni, 17 % Fe, 3 % Mo) in vacuum ($4\cdot10^{-5}$ mm Hg). The metal was sputtered onto a glass backing heated to 300°C (disk 18 mm in diameter) in an outer magnetic field of 90 oe brought about by Helmholtz coils. It was established from tables for harmonic functions obtained by decomposing into their components by the Fourier method that the harmonic function with the largest amplitude has a period π. This points to the presence of a uniaxial anisotropy. On the basis of curves of moments, obtained for the three films concerned in a field of 8500 oe, it was possible to calculate the anisotropy constants: $K = 1.4\cdot10^3$ (1300 Å); $K = 0.85\cdot10^3$ (800 Å);

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$K = 0.75 \cdot 10^3$ (400 Å). The hysteresis losses were calculated during a magnetic reversal cycle in rotating fields from the areas between the curves of moments using formula

$$Q_\tau = \int M d\psi$$

(M - value of mechanical moment, ψ - angle of rotation of the field). The areas were determined with the aid of a planimeter. The analysis of the difference curves of mechanical moments and the results found for each of the films in the calculation of hysteresis losses permit drawing the following conclusions: (1) on a rise of the field stress no changes are observed in the period of sinusoidal curves of moments. On a change of the field from 50 to 8500 oe the curves have a period equal to π, i.e., all specimens have uniaxial anisotropy; (2) the value of the maximum moment changes on a rise of the field strength in the same way as in the crystallographic anisotropy of single crystals, but proceeds more slowly in medium fields; with growing film thickness the maximum amount of the moment grows in the entire field strength range; (4) the hysteresis losses become larger in a slow field of rotation with growing field strength in the same way as in a cyclic magnetic reversal. This contradicts statements made by

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Measurement of hysteresis losses in... S/048/61/025/005/020/024
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N. S. Akulov for the rotation hysteresis in spatial single crystal specimens. According to that theory, hysteresis losses grow at the beginning up to a certain maximum, and vanish in fields exceeding the saturation field; (5) hysteresis losses are influenced by the film thickness. With growing thickness they become a little larger; (6) the films prepared without field with the aid of Helmholtz coils differ in no way, as to anisotropy, from films whose sputtering has taken place in the magnetic field of these coils. To bring about anisotropy in thin films it is probably sufficient for sputtering to take place in a field of a low intensity. Such a field may be created by the experimental conditions themselves: the field of the heating element of an electric heater as well as the earth's magnetic field. There are 6 figures and 8 references: 7 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Krasnoyarskiy institut tsvetnykh metallov im. M. I. Kalinina (Krasnoyarsk Institute of Nonferrous Metallurgy imeni M. I. Kalinin). Institut fiziki Sibirskogo otdeleniya Akademii nauk SSSR (Institute of Physics of the Siberian Department of the Academy of Sciences USSR)

Card 4/4

SAVCHENKO, M.K.; SINEGUBOV, V.I.

Boundary layers between domains in transformer steel. Izv. AN SSSR. Ser. fiz. 25 no.12:1449-1452 D '61. (MIRA 14:12)

1. Institut fiziki Sibirskogo otdeleniya AN SSSR.
(Ferrosilicon)
(Crystals--Magnetic properties)
(Boundary layer)

34181

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B117/B138

Behavior of the domain ...

was kept at 10^{-3} mm Hg during the experiments. In the absence of magnetic field the domain structure of all the specimens was highly stable. The behavior of the domain structure at various different temperatures is largely determined by the magnetic field strength. Magnetic reversal nucleation usually occurs in some sections of the film at quite low temperatures. With repeated magnetic reversal they are easily reproducible. At higher temperatures the number of nuclei increases, they grow, and the boundaries begin to move more rapidly and smoothly. When nuclei are formed magnetic reversal can only be achieved by increasing the temperature. H_s and H_o are temperature dependent. In some materials they decrease as the temperature rises. The curve for iron films at temperatures above 500°C showed an anomalous course, probably due to the different thermal expansion of base and film. There are 4 figures and 11 references: 3 Soviet and 8 non-Soviet. The three most recent references to the English-language publications read as follows: Smith D. O., Electronics, 32, 44 (1959); Murphy M., Control Engng., no. 10, 38 (1959); Olmen R. W., Mitchell E. N., J. Appl. phys., 30, 258 (1959).

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of the domain ...

34181

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B117/B138

24,2200

AUTHORS: Savchenko, M. K., Sudakov, N. I., and Izotova, T. P.

TITLE: Anisotropy of thin ferromagnetic films

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 2, 1962, 314 - 317

TEXT: This paper was presented at a conference on magnetism and antiferromagnetism. The authors studied the relationship between the anisotropy of ferromagnetic films and their structural defects and inhomogeneities. Pure Fe, Ni and permalloy (79% Ni, 17% Fe, 4% Mo) were vacuum evaporated on to polished optical glass disks ($1\cdot10^{-5}$ mm Hg). In some cases the base was rotated to prevent, or cause the uniform distribution of structural defects. Anisotrppy was determined from the mechanical momenta acting on the film in a rotating uniform magnetic field (4000 oe). The sensitivity of the anisometer was $1\cdot10^{3}$ erg cm^{-3} per mm of scale. Magnetic anisotropy was found to be dependent on the conditions under which the film was produced. Maximum anisotropy is observed with directed incidence

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Anisotropy of thin ...

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of the atom beam to the base. This confirmed earlier assumptions (Ref. 3, see below). In this case a very large number of aligned structural defects are formed in the film. Rotation of the base prevents this type of anisotropy. If the film is screened against the action of the magnetic field during formation an isotropic film will be formed. The study showed that the magnetic anisotropy can be varied in a wide range by choosing a suitable production process. There are 4 figures, 1 table, and 3 non-Soviet references. The reference to the English-language publication reads as follows: Ref. 3. Pugh E. W., Boyd E. L., Freedman I. F., J. Res. and Develop. Brit. C. I. R. A., 4, 163 (1960).

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ASSOCIATION: Institut fiziki Sibirskogo otdeleniya Akademii nauk SSSR (Institute of Physics of the Siberian Department of the Academy of Sciences USSR).
Krasnoyarskiy institut tsvetnykh metallov im. M. V. Kalinina (Krasnoyarsk Institute of Nonferrous Metals imeni M. V. Kalinin)

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